

## Amended Claims under the PCT article 34

1. (Amended) A shape-memory polybutylene terephthalate laminate film comprising (a) a polybutylene terephthalate film, and (b) at least one selected from the group consisting of a paper sheet, another resin film and a metal foil or a laminate comprising it, which is subjected to a shaping treatment to the first shape at a temperature  $T_1$  equal to or lower than the glass transition temperature of said polybutylene terephthalate, deformed to a second shape at a temperature  $T_2$  higher than said glass transition temperature, and then cooled to a temperature  $T_3$  equal to or lower than said glass transition temperature so that said laminate film is fixed to said second shape, said polybutylene terephthalate laminate film substantially recovering said first shape from said second shape when exposed to said temperature  $T_1$  or higher.
2. (Amended) The shape-memory polybutylene terephthalate laminate film according to claim 1, wherein said temperature  $T_1$  is 35°C or lower, said temperature  $T_2$  is higher than 45°C and 65°C or lower, and said temperature  $T_3$  is 15 to 25°C.
3. (Amended) The shape-memory polybutylene terephthalate laminate film according to claim 1 or 2, wherein said temperature  $T_1$  is 15 to 25°C.
4. (Amended) A shape-memory polybutylene terephthalate laminate film comprising (a) a polybutylene terephthalate film, and (b) at least one selected from the group consisting of a paper sheet, another resin film and a metal foil or a laminate comprising it, which is subjected to a shaping treatment to the first shape at a temperature  $T_4$  higher than the glass transition temperature and lower than the melting point of said polybutylene terephthalate, cooled to a temperature  $T_5$  equal to or lower

than said glass transition temperature so that said laminate film is fixed to said first shape, deformed to a second shape at a temperature  $T_6$  higher than said glass transition temperature and lower than said  $T_4$ , and then cooled to a temperature  $T_7$  equal to or lower than said glass transition temperature so that said laminate film is fixed to said second shape, said polybutylene terephthalate laminate film substantially recovering said first shape from said second shape when exposed to said temperature  $T_4$  or higher.

5. (Amended) The shape-memory polybutylene terephthalate laminate film according to claim 4, wherein said temperature  $T_4$  is 75 to 100°C, said temperature  $T_5$  is 40°C or lower, said temperature  $T_6$  is 45 to 65°C, and said temperature  $T_7$  is 40°C or lower.

6. (Amended) The shape-memory polybutylene terephthalate laminate film according to claim 4 or 5, wherein said temperature  $T_4$  is 90 to 100°C.

7. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 6, wherein said first shape is a curled shape, and said second shape is substantially a flat shape or an oppositely curled shape.

8. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 6, wherein said first shape is a tray shape, and said second shape is a flat shape.

9. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 8 and 58 to 60, which has at least one entire surface provided with a lot of substantially parallel linear scratches, whereby it can be torn substantially straight along said linear scratches from any point.

10. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 9, 61 and 62, wherein the

depth of said linear scratches is 1 to 40% of the thickness of said polybutylene terephthalate film.

11. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 9, 10, 61 and 62, wherein the  
5 depth of said linear scratches is 0.1 to 10  $\mu\text{m}$ , and the width of said linear scratches is 0.1 to 10  $\mu\text{m}$ ; and wherein the intervals of said linear scratches are 10 to 200  $\mu\text{m}$ .

12. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 9 to 11, 61 and 62, which has  
10 at least one surface vapor-deposited with a ceramic or a metal.

13. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 12 and 58 to 62, which has a layer structure comprising said polybutylene terephthalate film, said paper sheet and a sealant film in this order.

14. (Amended) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 12 and 58 to 62, which has a layer structure comprising said polybutylene terephthalate film, said paper sheet, a rigid film and a sealant film in this order.

15. (Amended) The shape-memory polybutylene terephthalate  
20 laminate film according to any one of claims 1 to 12 and 58 to 62, which has a layer structure comprising said polybutylene terephthalate film, a rigid film and a sealant film in this order.

16. The shape-memory polybutylene terephthalate laminate film according to any one of claims 13 to 15, which has a light-screening ink  
25 layer on a surface of said polybutylene terephthalate film on the side of said paper sheet, or on a surface of said rigid film on the side of said sealant film.

17. (Amended) A package sheet constituted by the shape-memory

polybutylene terephthalate laminate film recited in any one of claims 1 to 16 and 58 to 62.

18. (Amended) A container lid constituted by the shape-memory polybutylene terephthalate laminate film recited in any one of claims 1 to 5 16 and 58 to 62.

19. A method for producing a shape-memory polybutylene terephthalate laminate film comprising (a) a polybutylene terephthalate film, and (b) at least one selected from the group consisting of a paper sheet, another resin film and a metal foil, or a laminate comprising it, said 10 method comprising the steps of (1) subjecting a laminate film comprising said polybutylene terephthalate film and another film or film laminate to a shaping treatment at a temperature  $T_1$  equal to or lower than the glass transition temperature of said polybutylene terephthalate while maintaining a first shape; (2) deforming the shaped laminate film to a second shape at a 15 temperature  $T_2$  higher than said glass transition temperature; and (3) cooling said laminate film to a temperature  $T_3$  equal to or lower than said glass transition temperature so that said laminate film is fixed to said second shape.

20. The method for producing a shape-memory polybutylene 20 terephthalate laminate film according to claim 19, wherein said first shape is a curled shape, and said second shape is substantially a flat shape or an oppositely curled shape.

21. The method for producing a shape-memory polybutylene terephthalate laminate film according to claim 20, wherein a laminate film 25 comprising said polybutylene terephthalate film adhered to another film or film laminate is conveyed by a roll, such that said laminate film is worked along a peripheral surface of said roll at said temperature  $T_1$  to have a curled shape.

22. The method for producing a shape-memory polybutylene terephthalate laminate film according to any one of claims 19 to 21, wherein said laminate film is deformed at said temperature  $T_2$  for 30 to 60 seconds.
- 5 23. The method for producing a shape-memory polybutylene terephthalate laminate film according to any one of claims 19 to 22, wherein said temperature  $T_1$  is 35°C or lower, said temperature  $T_2$  is higher than 45°C and 65°C or lower, and said temperature  $T_3$  is 15 to 25°C.
24. The method for producing a shape-memory polybutylene  
10 terephthalate laminate film according to any one of claims 19 to 23, wherein said temperature  $T_1$  is 15 to 25°C.
25. The method for producing a shape-memory polybutylene terephthalate laminate film according to any one of claims 20 to 24, wherein the curled laminate film is cooled to said temperature  $T_3$ , and then  
15 wound in an uncurling direction.
26. (Amended) The method for producing a shape-memory polybutylene terephthalate laminate film according to any one of claims 19 to 25, wherein a tension of 4 kgf/m (width) or more is applied to said polybutylene terephthalate film when said polybutylene terephthalate film  
20 is adhered to another film or film laminate.
27. The method for producing a shape-memory polybutylene terephthalate laminate film according to claim 26, wherein said tension is 10 to 20 kgf/m (width).
28. A method for producing a shape-memory polybutylene  
25 terephthalate laminate film comprising (a) polybutylene terephthalate film, and (b) at least one selected from the group consisting of a paper sheet, another resin film and a metal foil, or a laminate comprising it, said method comprising the steps of (1) (i) laminating said polybutylene terephthalate

film with another film or film laminate, after a shaping treatment at a temperature  $T_4$  higher than the glass transition temperature and lower than the melting point of said polybutylene terephthalate while maintaining said polybutylene terephthalate film in a first shape, or (ii) producing a laminate film of said polybutylene terephthalate film and another film or film laminate in advance, and subjecting it to a shaping treatment at said temperature  $T_4$  while maintaining it in the first shape to produce the shaped laminate film having said first shape; (2) cooling the shaped laminate film to a temperature  $T_5$  equal to or lower than said glass transition temperature to fix it to said first shape; (3) deforming said shaped laminate film to a second shape at a temperature  $T_6$  higher than said glass transition temperature and lower than said temperature  $T_4$ ; and then (4) cooling the deformed laminate film to a temperature  $T_7$  equal to or lower than said glass transition temperature to fix it to said second shape.

29. The method for producing a shape-memory polybutylene terephthalate laminate film according to claim 28, wherein said first shape is a curled shape, and said second shape is substantially a flat shape or an oppositely curled shape.

30. The method for producing a shape-memory polybutylene terephthalate laminate film according to claim 28 or 29, wherein said temperature  $T_4$  is 75 to 100°C; said temperature  $T_5$  is 40°C or lower; said temperature  $T_6$  is 45 to 65°C; and said temperature  $T_7$  is 40°C or lower.

31. The method for producing a shape-memory polybutylene terephthalate laminate film according to claim 29 or 30, comprising conveying said polybutylene terephthalate film in contact with a peripheral surface of one of a pair of heat rolls, heating it at said temperature  $T_4$  along the peripheral surface of said heat roll to provide said polybutylene terephthalate film with a curled shape, and then continuously adhering the

curled polybutylene terephthalate film to another film or film laminate by causing them to pass through a pair of said heat rolls, thereby providing a curled laminate film.

32. The method for producing a shape-memory polybutylene  
5 terephthalate laminate film according to claim 29 or 30, wherein said polybutylene terephthalate laminate film is conveyed by a heat roll to treat it at said temperature  $T_4$  along the peripheral surface of said heat roll.

33. (Amended) The method for producing a shape-memory  
polybutylene terephthalate laminate film according to any one of claims 28  
10 to 32, wherein a tension of 4 kgf/m (width) or more is applied to said polybutylene terephthalate film at the time of adhering said polybutylene terephthalate film to another film or film laminate.

34. The method for producing a shape-memory polybutylene  
terephthalate laminate film according to claim 33, wherein said tension is  
15 10 to 20 kgf/m (width).

35. (Amended) The method for producing a shape-memory  
polybutylene terephthalate laminate film according to any one of claims 29  
to 34, wherein the curled laminate film is cooled to said temperature  $T_5$ ,  
wound in an uncurling direction, heat-treated at said temperature  $T_6$  and  
20 then cooled to said temperature  $T_7$ .

36. (Amended) A method for producing a container having a lid  
heat-sealed to a container body, said lid being composed of the  
shape-memory polybutylene terephthalate laminate film recited in any one  
of claims 1 to 16 and 58 to 62, comprising the steps of annealing said  
25 shape-memory polybutylene terephthalate laminate film at a temperature  $T_8$   
higher than the glass transition temperature of said polybutylene  
terephthalate while keeping it flat; and punching and heat-sealing the  
resultant substantially flat shape-memory polybutylene terephthalate

APT 2A ANDT

lamine film to said container body by a lid-sealing means, thereby adhering said lid composed of said shape-memory polybutylene terephthalate lamine film to said container.

37. The method for producing a container having a lid composed of a shape-memory polybutylene terephthalate lamine film according to claim 5 36, wherein said annealing is conducted for 30 to 60 seconds.

38. The method for producing a container having a lid composed of a shape-memory polybutylene terephthalate lamine film according to claim 36 or 37, wherein said temperature  $T_8$  is 80 to 120°C.

10 39. (Amended) A method for producing a polybutylene terephthalate film from a polybutylene terephthalate resin by an air-cooled inflation method, comprising the steps of: ejecting a humid air through a first cooling ring disposed near an annular die to cool a neck portion of a bubble to 130°C or lower; ejecting a humid air through a second cooling ring 15 disposed above the annular die by the distance 5 to 10 times the opening diameter of the annular die to cool said bubble to 80°C or lower; and keeping the temperature around a cylindrical net disposed between said first cooling ring and said second cooling ring constant to stabilizing the temperature of said bubble cooled by said first cooling ring and said second 20 cooling ring; at a blow-up ratio of 1.5 to 2.8, a resin extrusion temperature of 210 to 250°C, and a resin-extruding pressure of 9.8 to 13.7 MPa.

40. (Amended) The method for producing a polybutylene terephthalate film according to claim 39, wherein said a partition disposed around a bubble region above a frost line of said bubble with a gap isolates 25 said bubble region from an ambient atmosphere to keep a temperature around said bubble uniform.

41. (Amended) The method for producing a polybutylene terephthalate film according to claim 39 or 40, wherein a humid air ejected



from a cooling-air-ejecting means disposed in a lower portion of said net is blown up along an outer surface of said cylindrical net, to cool the surrounding of said net to a temperature of 30 to 40°C.

42. (Amended) The method for producing a polybutylene  
5 terephthalate film according to any one of claims 39 to 41, wherein a humid air is ejected from a third cooling ring disposed above said second cooling ring by the distance 0.5 to 5.0 times the opening diameter of the annular die to cool said bubble to a temperature of 50°C or lower.

43. (Amended) The method for producing a polybutylene  
10 terephthalate film according to any one of claims 40 to 42, wherein humid airs ejected from said first to third cooling rings and a cooling-air-ejecting means are rectified by a plurality of heating air exits disposed in said partition and by a rectifying plate inside said partition.

44. The method for producing a polybutylene terephthalate film  
15 according to any one of claims 39 to 43, wherein the temperature of said humid air is 15 to 25°C.

45. (Amended) An easy-to-straight-tear polybutylene terephthalate film comprising a polybutylene terephthalate film having a lot of substantially parallel linear scratches at least one entire surface formed by  
20 pressing said polybutylene terephthalate film to a roll or plate while said polybutylene terephthalate film is in sliding contact with said roll or plate having a lot of fine particles with large hardness, whereby it can be torn substantially straight along said linear scratches from any point.

46. (Amended) The easy-to-straight-tear polybutylene terephthalate  
25 film according to any one of claims 45, 63 and 64, wherein the depth of said linear scratches is 1 to 40% of the film thickness.

47. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45, 46, 63 and 64, wherein the depth of

NEW 2019-07-07

said linear scratches is 0.1 to 10  $\mu\text{m}$ .

48. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45 to 47, 63 and 64, wherein the width of said linear scratches is 0.1 to 10  $\mu\text{m}$ .

5 49. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45 to 48, 63 and 64, wherein the intervals of said linear scratches are 10 to 200  $\mu\text{m}$ .

50. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45 to 49, 63 and 64, wherein a lot of  
10 fine penetrating pores and/or non-penetrating pores are uniformly formed.

51. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45 to 50, 63 and 64, wherein said easy-to-straight-tear polybutylene terephthalate film is a single-layer film or a laminate film.

15 52. The easy-to-straight-tear polybutylene terephthalate film according to claim 51, wherein said laminate film comprises at least one layer composed of a film having said linear scratches, and a sealant film layer.

53. (Amended) The easy-to-straight-tear polybutylene terephthalate film according to any one of claims 45 to 52, 63 and 64, wherein a ceramic  
20 or a metal is vapor-deposited thereon.

54. (Amended) A package sheet composed of the easy-to-straight-tear polybutylene terephthalate film recited in any one of claims 45 to 53, 63 and 64.

55. (Amended) A porous polybutylene terephthalate film produced  
25 by the method recited in any one of claims 39 to 44 comprising a polybutylene terephthalate film having a lot of fine penetrating pores and/or non-penetrating pores formed uniformly, thereby having good twist retention.

56. The porous polybutylene terephthalate film according to claim 55, wherein said fine pores having an average opening diameter of 0.5 to 100  $\mu\text{m}$  at a density of 500/ $\text{cm}^2$  or more.

57. A package sheet composed of the porous polybutylene terephthalate film recited in claim 55 or 56.

58. (Added) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 8, wherein said polybutylene terephthalate laminate film adheres to another film or film laminate in a state where the elongated polybutylene terephthalate laminate film keeps an elastic recovery force.

59. (Added) The shape-memory polybutylene terephthalate laminate film according to claim 58, wherein said polybutylene terephthalate film adheres to another film or film laminate in a state where the polybutylene terephthalate laminate film is stretched by 1 to 3%.

60. (Added) The shape-memory polybutylene terephthalate laminate film according to any one of claims 1 to 8, 58 and 59, wherein said polybutylene terephthalate film is formed: by ejecting a humid air through a first cooling ring disposed near an annular die to cool a neck portion of a bubble to 130°C or lower; by ejecting a humid air through a second cooling ring disposed above the annular die by the distance 5 to 10 times the opening diameter of the annular die to cool said bubble to 80°C; and by keeping the temperature around a cylindrical net disposed between said first cooling ring and said second cooling ring constant to stabilizing the temperature of said bubble cooled by said first cooling ring and said second cooling ring; at a blow-up ratio of 1.5 to 2.8, a resin extrusion temperature of 210 to 250°C, and a resin-extruding pressure of 9.8 to 13.7 MPa.

61. (Added) The shape-memory polybutylene terephthalate laminate film according to claim 9, wherein said linear scratches are formed by bringing

said polybutylene terephthalate film into sliding contact with a means for forming linear scratches having a lot of fine projections, while said polybutylene terephthalate film is pressed to a means for forming linear scratches by a means for pressing said polybutylene terephthalate film to

5 said means for forming linear scratches from the other side of said polybutylene terephthalate film at the portion where said polybutylene terephthalate film is brought into contact with said means for forming linear scratches.

62. (Added) The shape-memory polybutylene terephthalate laminate film according to claim 61, wherein said means for forming linear scratches is a

10 roll or plate having a lot of fine particles with large hardness on its surface.

63. (Added) The easy-to-straight-tear polybutylene terephthalate film according to claim 45, wherein said means for pressing said film is a air-blowing means or a brush in sliding contact with said polybutylene

15 terephthalate film.

64. (Added) The easy-to-straight-tear polybutylene terephthalate film according to claim 45 or 63, wherein said polybutylene terephthalate film is produced by the method recited in any one of claims 39 to 44.